

THE EMBODIMENTS OF THE INVENTION IN WHICH AN EXCLUSIVE PROPERTY OR PRIVILEGE IS CLAIMED ARE DEFINED AS FOLLOWS:

1. (Currently Amended) An image processing system having a statistical appearance model for interpreting a digital image, the appearance model having at least one model parameter, the system comprising:

a multi-dimensional first model object including an associated first statistical relationship and configured for deforming to approximate a shape and texture of a multi-dimensional target object in the digital image, and a multi-dimensional second model object including an associated second statistical relationship and configured for deforming to approximate the shape and texture of the target object in the digital image, the second ~~model object having a shape and texture configuration~~ statistical relationship being different from the first statistical relationship model object such that the difference represents at least one of an anatomical geometry for a different position in a patient anatomy represented by the digital image or a different pathology;

a search module for applying the first model object to the image for generating a multi-dimensional first output object approximating the shape and texture of the target object and calculating a first error between the first output object and the target object, and for applying the second model object to the image for generating a multi-dimensional second output object approximating the shape and texture of the target object and calculating a second error between the second output object and the target object;

a selection module for comparing the first error with the second error such that one of the output objects with the least significant error is selected; and

an output module for providing data representing the selected output object to an output.

2. (Original) The system according to claim 1; wherein the first model object is optimised for identifying a first one of the target object and the second model object is optimised for identifying a second one of the target object, such that the second target object having an shape and texture configuration different from the first target object.

3. (Original) The system according to claim 2 further comprising the digital image being one of a set of digital images, wherein each of the model objects are configured for being applied by the search module to each of the digital images of the set.
4. (Original) The system according to claim 3 further comprising the selection module configured for selecting one of the object models to represent all the images in the set.
5. (Original) The system according to claim 1; wherein the output is selected from the group comprising an output file for storage in a memory and a user interface.
6. (Original) The system according to claim 2 further comprising a training module configured for having a set of training images including a plurality of training objects with different appearance configurations, the training module for training the appearance model to have a plurality of the model objects optimised for identifying valid ranges of the shape and texture of respective ones of the target object.
7. (Original) The system according to claim 2, wherein the appearance model is an active appearance model.
8. (Original) The system according to claim 2, wherein the first and second model objects represent different pathology types of patient anatomy.
9. (Original) The system according to claim 2, wherein the first and second model objects represent different appearance configurations of the same anatomy of two different two dimensional slices taken from spaced apart locations of an image volume of the anatomy.
10. (Original) The system according to claim 8, wherein the two different pathology types represented by two different training objects in a set of training images.

11. (Original) The system according to claim 1 further comprising a predefined characteristic associated with the model parameter of the selected model object, the predefined characteristic for aiding a diagnosis of a patient having an anatomy represented by the selected output object.
12. (Original) The system according to claim 11, wherein the model parameter is partitioned in to a plurality of value regions, each of the regions assigned one of a plurality of the predefined characteristics.
13. (Original) The system according to claim 12, wherein the model parameter is selected from the group comprising a shape and texture parameter, a scale parameter and a rotation parameter.
14. (Original) The system according to claim 12, wherein at least two of the predefined characteristics represent different pathology types of the anatomy.
15. (Original) The system according to claim 12, wherein the output module provides to the output the predefined characteristic assigned to the selected output object.
16. (Original) The system according to claim 12 further comprising a training module configured for assigning the plurality of the predefined characteristics to the model parameter.
17. (Original) The system according to claim 15 further comprising a confirmation module for determining if the value of the model parameter assigned to the selected output object is within one of the partitioned regions.
18. (Original) The system according to claim 17, wherein the value of the model parameter when outside of all the partitioned value regions indicates the first output object is an invalid approximation of the target object.
19. (Canceled)

20. (Canceled)
21. (Canceled)
22. (Canceled)
22. (Canceled)
23. (Canceled)
24. (Canceled)
25. (Canceled)
26. (Canceled)
27. (Currently Amended) A method for interpreting a digital image with a statistical appearance model, the appearance model having at least one model parameter, the method comprising the steps of:  
    providing a multi-dimensional first model object including an associated first statistical relationship and configured for deforming to approximate a shape and texture of a multi-dimensional target object in the digital image;  
    providing a multi-dimensional second model object including an associated second statistical relationship and configured for deforming to approximate the shape and texture of the target object in the digital image, the second ~~model object having a shape and texture configuration~~ statistical relationship being different from the first statistical relationship model object such that the difference represents at least one of an anatomical geometry for a different position in a patient anatomy represented by the digital image or a different pathology;  
    applying the first model object to the image for generating a multi-dimensional first output object approximating the shape and texture of the target object;

calculating a first error between the first output object and the target object;  
applying the second model object to the image for generating a multi-dimensional second output object approximating the shape and texture of the target object;  
calculating a second error between the second output object and the target object;  
comparing the first error with the second error such that one of the output objects with the least significant error is selected; and  
providing data representing the selected output object to an output.

28. (Currently Amended) A computer program product for interpreting a digital image using a statistical appearance model, the appearance model having at least one model parameter, the computer program product comprising:
- a computer readable medium;
  - an object module stored on the computer readable medium configured for having a multi-dimensional first model object including an associated first statistical relationship and configured for deforming to approximate a shape and texture of a multi-dimensional target object in the digital image, and a multi-dimensional second model object including an associated second statistical relationship and configured for deforming to approximate the shape and texture of the target object in the digital image;
  - a search module stored on the computer readable medium for applying the first model object to the image for generating a multi-dimensional first output object approximating the shape and texture of the target object and calculating a first error between the first output object and the target object, and for applying the second model object to the image for generating a multi-dimensional second output object approximating the shape and texture of the target object and calculating a second error between the second output object and the target object, the second ~~model object having a shape and texture configuration~~ statistical relationship being different from the first statistical relationship model object such that the difference represents at least one of an anatomical geometry for a different position in a patient anatomy represented by the digital image or a different pathology;
  - a selection module coupled to the search module for comparing the first error with the second error such that one of the output objects with the least significant error is selected; and

an output module coupled to the selection module for providing data representing the selected output object to an output.

29. (Canceled)
30. (Canceled)